

When it comes to accepting evolution, gut feelings trump facts

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For students to accept the theory of evolution, an intuitive "gut feeling" may be just as important as understanding the facts, according to a new study.

In an analysis of the beliefs of biology teachers, researchers found that a quick intuitive notion of how right an idea feels was a powerful driver of whether or not [students](#) accepted evolution—often trumping factors such as knowledge level or religion.

"The whole idea behind acceptance of evolution has been the assumption that if people understood it – if they really knew it – they would see the logic and accept it," said David Haury, co-author of the new study and associate professor of education at Ohio State University.

"But among all the scientific studies on the matter, the most consistent finding was inconsistency. One study would find a strong relationship between knowledge level and acceptance, and others would find no relationship. Some would find a strong relationship between religious identity and acceptance, and others would find less of a relationship."

"So our notion was, there is clearly some factor that we're not looking at," he continued. "We're assuming that people accept something or don't accept it on a completely rational basis. Or, they're part of a belief community that as a group accept or don't accept. But the findings just made those simple answers untenable."

Haury and his colleagues tapped into cognitive science research showing that our brains don't just process ideas logically—we also rely on how true something feels when judging an idea. "Research in neuroscience has shown that when there's a conflict between facts and feeling in the brain, feeling wins," he says.

The researchers framed a study to determine whether intuitive reasoning could help explain why some people are more accepting of evolution than others. The study, published in the *Journal of Research in Science Teaching*, included 124 pre-service biology teachers at different stages in a standard teacher preparation program at two Korean universities.

First, the students answered a standard set of questions designed to measure their overall acceptance of evolution. These questions probed whether students generally believed in the main concepts and scientific findings that underpin the theory.

Then the students took a test on the specific details of evolutionary science. To show their level of factual knowledge, students answered multiple-choice and free-response questions about processes such as natural selection. To gauge their "gut" feelings about these ideas, students wrote down how certain they felt that their factually correct answers were actually true.

The researchers then analyzed statistical correlations to see whether knowledge level or feeling of certainty best predicted students' overall acceptance of evolution. They also considered factors such as academic year and religion as potential predictors.

"What we found is that intuitive cognition has a significant impact on what people end up accepting, no matter how much they know," said Haury. The results show that even students with greater knowledge of evolutionary facts weren't likelier to accept the theory, unless they also

had a strong "gut" feeling about those facts.

When trying to explain the patterns of whether people believe in evolution or not, "the results show that if we consider both feeling and knowledge level, we can explain much more than with knowledge level alone," said Minsu Ha, lead author on the paper and a Ph.D. candidate in the School of Teaching and Learning.

In particular, the research shows that it may not be accurate to portray religion and science education as competing factors in determining beliefs about evolution. For the subjects of this study, belonging to a religion had almost no additional impact on beliefs about evolution, beyond subjects' feelings of certainty.

These results also provide a useful way of looking at the perceived conflict between religion and science when it comes to teaching evolution, according to Haury. "Intuitive cognition not only opens a new door to approach the issue," he said, "it also gives us a way of addressing that issue without directly questioning religious views."

When choosing a setting for their study, the team found that Korean teacher preparation programs were ideal. "In Korea, people all take the same classes over the same time period and are all about the same age, so it takes out a lot of extraneous factors," said Haury. "We wouldn't be able to find a sample group like this in the United States."

Unlike in the U.S., about half of Koreans do not identify themselves as belonging to any particular religion. But according to Ha, who is from Korea, certain religious groups consider the topic of evolution just as controversial as in the U.S.

To ensure that their results were relevant to U.S. settings, the researchers compared how the Korean students did on the knowledge tests with

previous studies of U.S. students. "We found that the both groups were comparable in terms of the overall performance," said Haury.

For teaching [evolution](#), the researchers suggest using exercises that allow students to become aware of their brains' dual processing. Knowing that sometimes what their "gut" says is in conflict with what their "head" knows may help students judge ideas on their merits.

"Educationally, we think that's a place to start," said Haury. "It's a concrete way to show them, look—you can be fooled and make a bad decision, because you just can't deny your gut."

Ha and Haury collaborated on this study with Ross Nehm, associate professor of education at the Ohio State University. The research was funded by the National Science Foundation.

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